Avaya Solution & Interoperability Test Lab

Application Notes for Foundry Networks FastIron Super X Power over Ethernet (PoE) Switch with Avaya IP Telephones and Avaya Wireless Access Points - Issue 1.0

Abstract

These Application Notes describe the procedures for configuring the Foundry Networks FastIron Super X switch to provide inline Power over Ethernet (PoE) to Avaya IP Telephones and Avaya Wireless Access Points. During compliance testing, Avaya IP Telephones and Wireless Access Points successfully obtained power and transferred data over standard Ethernet cables from a Foundry Networks FastIron Super X switch. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

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1. Introduction

Power over Ethernet (PoE) allows both power and data to be simultaneously carried over standard Ethernet cables. PoE-enabled Ethernet switches can supply power directly to Ethernet devices, thereby simplifying installation and removing the need for separate power supplies for those devices. The IEEE 802.3af standard defines the mechanisms for Power Sourcing Equipment (PSE), such as PoE-enabled Ethernet switches, to detect, classify, and supply power to Powered Devices (PDs), such as PoE-enabled IP telephones and wireless access points. In the compliance-tested configuration described in these Application Notes, a Foundry Networks FastIron Super X Switch has a PSE configured to supply inline PoE to Avaya PDs, specifically Avaya IP Telephones and an Avaya AP-8 Wireless Access Points.

As illustrated in **Figure 1**, the Avaya PDs covered in these Application Notes include the following:

- 4601 IP Telephone
- 4602 IP Telephone
- 4602SW IP Telephones
- 4610SW IP Telephone
- 4620 IP Telephone
- 4620SW IP Telephone
- 4621SW IP Telephone
- 4622SW IP Telephone
- 4625SW IP Telephone
- 4630SW IP Telephone
- 5601 IP Telephone
- 5602SW IP Telephone
- 5610SW IP Telephone
- 5620SW IP Telephone
- Avaya Gen-2 4606, 4612, and 4624 IP Telephones
- Avaya Wireless AP-8 802.11a/b/g Access Point

The Avaya 4612 and 4624 IP Telephones can be identified as Gen-2 by inspecting the model number. "2A" in the model number indicates Gen-2. The model number can be found by:

- Inspecting the label attached to the bottom of the telephone.

OR

- Pressing **Mute**, **V**, **I**, **E**, **W**, **#** on the keypad and then pressing ***** until the model number appears. Press **#** to exit.

An example of a model number is 4612D0**2A**-003 (Gen-2).

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The Avaya 4620SW Class 2 and Class 3 IP Telephones can be differentiated by the microphone at the bottom right side of the telephone. If the microphone has one hole, it is Class 2, and if it has two holes, it is Class 3.

Powered device classifications of the phones are defined by the Institute of Electrical and Electronics Engineers (IEEE) 802.3af. Each Powered Device is classified into one of the IEEE's five classes. (The IEEE 802.3af PSE and Powered-Device Power Classifications chart can be seen in Table 2).

The powering tests included verification of the following after the product was connected to the switch:

- Successful boot operation.
- For Avaya IP Telephones, successful registration with Avaya Communication Manager or Avaya IP Office (for the Avaya 5600-Series IP Telephones), completion of a test call, and raising speakerphone volume to maximum value.
- For the Wireless Access Point, successful registration of a wireless enabled Avaya IP Softphone with Avaya Communication Manager and completion of a test call.
- Connecting a mix of 22 Avaya IP Telephones and an Avaya AP-8 Wireless Access Point to the switch, power cycling the switch and verifying successful boot operation and registration of the devices to Avaya Communication Manager and Avaya IP Office Small Office Edition.

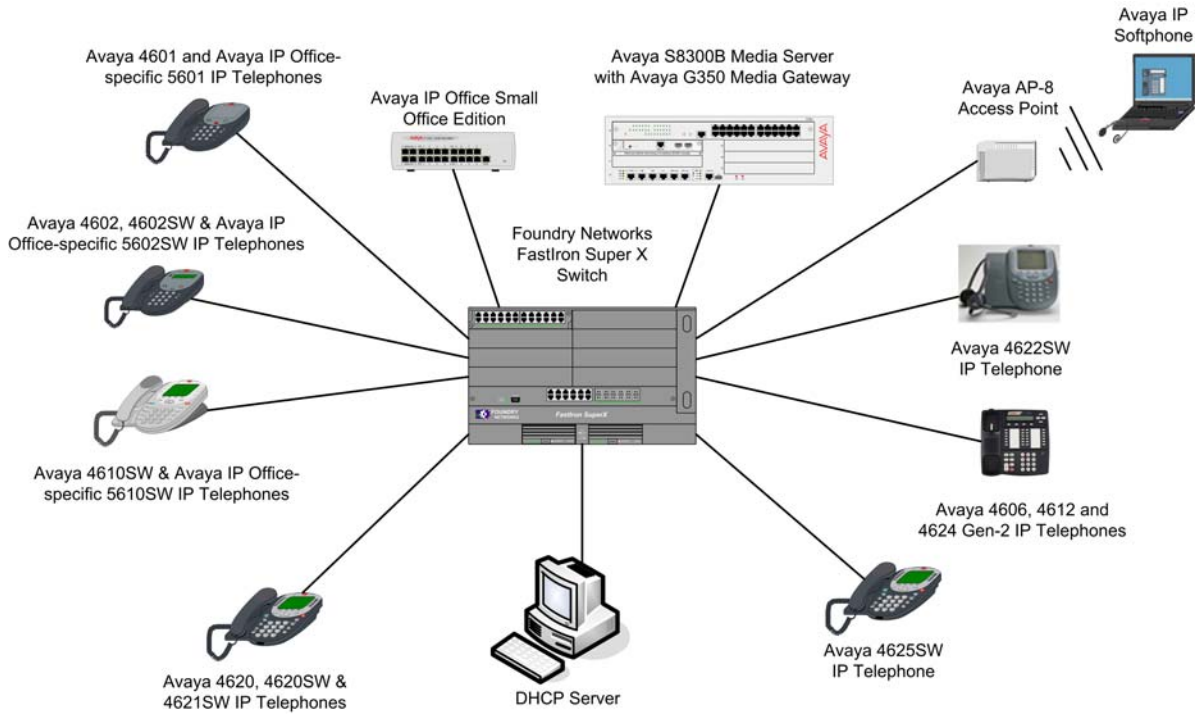
Avaya 4601 and Avaya IP Office-specific 5601 IP Telephones
Avaya IP Office Small Office Edition
Avaya S8300B Media Server with Avaya G350 Media Gateway
Avaya IP Softphone
Avaya AP-8 Access Point
Avaya 4602, 4602SW & Avaya IP Office-specific 5602SW IP Telephones
Foundry Networks FastIron Super X Switch
Avaya 4622SW IP Telephone
Avaya 4610SW & Avaya IP Office-specific 5610SW IP Telephones
Avaya 4606, 4612 and 4624 Gen-2 IP Telephones
Avaya 4620, 4620SW & 4621SW IP Telephones
DHCP Server
Avaya 4625SW IP Telephone

Figure 1: PoE Interoperability Between Foundry Networks FastIron Super X Switch and Avaya IP Telephones and Avaya Wireless Access Points

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2. Equipment and Software Validated

The following equipment and software/firmware were used for the sample configuration provided:

Equipment	Software/Firmware
Avaya S8300 Media Server in a G350 Media Gateway	3.0.1 (load 346)
Avaya IP Office – Small Office Edition	3.0(55)
Avaya 4601 IP Telephone	1.8.0
Avaya 4602 IP Telephone	1.8.2
Avaya 4602SW IP Telephone	2.3
Avaya 4610SW IP Telephone	2.3
Avaya 4620 IP Telephone	2.3
Avaya 4620SW IP Telephone	2.3
Avaya 4621SW IP Telephone	2.3
Avaya 4622SW IP Telephone	2.3
Avaya 4625SW IP Telephone	2.5
Avaya 4630SW IP Telephone	1.810
Avaya 5601 IP Telephone (IP Office specific)	1.806
Avaya 5602SW IP Telephone (IP Office specific)	2.2.3
Avaya 5610SW IP Telephone (IP Office specific)	2.2.3
Avaya 5620SW IP Telephone (IP Office specific)	2.2.3
Avaya Gen-2 4606 IP Telephone	1.8.3
Avaya Gen-2 4612 IP Telephone	1.8.3
Avaya Gen-2 4624 IP Telephone	1.8.3
Avaya AP-8 Wireless Access Point	2.6.0(914)
Avaya IP Softphone	5.2.3.6
Foundry Networks FastIron Super X Switch	2.4.00

Table 1: Equipment and Software/Firmware

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3. Configure the FastIron Super X Switch

Inline Power over Ethernet (PoE) is supported on the Foundry Networks Super X Switch. By default, PoE support is disabled on all the 10/100/1000 BaseT ports. Power over Ethernet can be configured on the 24-port gigabit copper module via the browser interface or command line interface (CLI). The following configuration file was provisioned using the Foundry CLI.

```
Current configuration:
!
ver 02.4.00T3e3
!
module 1 fi-sx4-24-port-gig-copper-module
module 9 fi-sx4-12-combo-port-management-module
!
global-stp
!
!
vlan 1 name DEFAULT-VLAN by port
 spanning-tree 802-1w
!
vlan 10 by port
 tagged ethe 1/1 to 1/4 ethe 1/6 to 1/7 ethe 1/9 ethe 1/11 ethe 1/17 ethe
1/22 to 1/24
 untagged ethe 1/19
 router-interface ve 10 //Map Virtual Engine's to VID's, ex. Ve 10 to VLAN 10
 spanning-tree 802-1w
 spanning-tree 802-1w ethe 1/1 admin-edge-port
 spanning-tree 802-1w ethe 1/2 admin-edge-port
 spanning-tree 802-1w ethe 1/3 admin-edge-port
 spanning-tree 802-1w ethe 1/4 admin-edge-port
 spanning-tree 802-1w ethe 1/7 admin-edge-port
 spanning-tree 802-1w ethe 1/9 admin-edge-port
 spanning-tree 802-1w ethe 1/11 admin-edge-port
 spanning-tree 802-1w ethe 1/22 path-cost 50000 admin-pt2pt-mac
 spanning-tree 802-1w ethe 1/23 admin-pt2pt-mac
 spanning-tree 802-1w ethe 1/24 admin-pt2pt-mac
!
vlan 9 by port
 tagged ethe 1/1 to 1/4 ethe 1/6 to 1/7 ethe 1/9 ethe 1/11 ethe 1/17 ethe
1/22 to 1/24
 router-interface ve 9
 spanning-tree 802-1w
 spanning-tree 802-1w ethe 1/1 admin-edge-port
 spanning-tree 802-1w ethe 1/2 admin-edge-port
 spanning-tree 802-1w ethe 1/3 admin-edge-port
 spanning-tree 802-1w ethe 1/4 admin-edge-port
 spanning-tree 802-1w ethe 1/7 admin-edge-port
 spanning-tree 802-1w ethe 1/9 admin-edge-port
 spanning-tree 802-1w ethe 1/11 admin-edge-port
 spanning-tree 802-1w ethe 1/22 path-cost 50000 admin-pt2pt-mac
 spanning-tree 802-1w ethe 1/23 admin-pt2pt-mac
 spanning-tree 802-1w ethe 1/24 admin-pt2pt-mac
!
!
```


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```
!
!
!
hostname SuperX
router ospf
 area 0
!
interface ethernet 1/1
 port-name 4625SW       // Optionally define a port name
 dual-mode  9           // Enable dual-mode support. In this case, ethe 1/1
                        // will accept and transmit untagged frames to and
                        // from attached devices on VLAN 9 including both
                        // directly or indirectly attached PCs
 inline power           // Enable 802.1AF inline power for applicable ports
!
interface ethernet 1/2
 port-name 4621SW
 dual-mode  9
 inline power
!
interface ethernet 1/3
 port-name 4610SW
 dual-mode  9
 inline power
!
interface ethernet 1/4
 port-name 4622SW
 dual-mode  9
 inline power
!
interface ethernet 1/5
!
interface ethernet 1/6
 port-name 4620IP
 dual-mode  9
 inline power
!
interface ethernet 1/7
 port-name 4602IP
 dual-mode  9
 inline power
!
interface ethernet 1/8
 port-name 4624IP
 inline power
!
interface ethernet 1/9
 port-name 4620SW
 dual-mode  9
 inline power
!
interface ethernet 1/10
 port-name 4612IP
 inline power
!
interface ethernet 1/11
```


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```
 port-name 4602SW
 dual-mode  9
 inline power
!
interface ethernet 1/12
 port-name 4606IP
 inline power
!
interface ethernet 1/13
 port-name IP_Office
!
interface ethernet 1/14
 port-name 5602SW
 inline power
!
interface ethernet 1/15
 inline power
!
interface ethernet 1/16
 port-name 5610SW
 inline power
!
interface ethernet 1/17
 port-name 4601IP
 dual-mode  9
 inline power
!
interface ethernet 1/18
 port-name 5601IP
 inline power
!
interface ethernet 1/19
 port-name AP8
 inline power
!
interface ethernet 1/22
 port-name SINGLE_LINK
!
interface ethernet 1/23
 link-aggregate active
!
interface ethernet 1/24
 link-aggregate active
!
interface ve 9  // Create a virtual interface for each VLAN
 ip address 9.9.9.101 255.255.255.0
 ip helper-address 1 192.168.50.100
 ip ospf area 0
!
interface ve 10
 ip address 10.10.10.101 255.255.255.0
 ip helper-address 1 192.168.50.100
 ip ospf area 0
!
!
!
```


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```
!
!
!
!
end
```

Use the command **sh inline power** to view inline power statistics on each port.

```
Power Capacity:         Total is 1080000 mWatts. Current Free is 915200
mWatts.

Power Allocations:      Requests Honored 45 times

 Port Admin       Oper    ---Power(mWatts)---  PD Type  PD Class  Pri  Fault/
      State       State   Consumed  Allocated                        Error
-------------------------------------------------------------------------------
  1/1 On    On          7230      15400  802.3af  Class 3     3  n/a
  1/2 On    On          5070       7000  802.3af  Class 2     3  n/a
  1/3 On    On          3004       7000  802.3af  Class 2     3  n/a
  1/4 On    On          4882       7000  802.3af  Class 2     3  n/a
  1/5 Off   Off            0          0  n/a      n/a         3  n/a
  1/6 On    On          6854      15400  802.3af  Class 3     3  n/a
  1/7 On    On          2723       4000  802.3af  Class 1     3  n/a
  1/8 On    On          4601      15400  802.3af  n/a         3  n/a
  1/9 On    On          5070      15400  802.3af  Class 3     3  n/a
 1/10 On    On          4789      15400  802.3af  n/a         3  n/a
 1/11 On    On          3098       7000  802.3af  Class 2     3  n/a
 1/12 On    On          4695      15400  802.3af  n/a         3  n/a
 1/13 Off   Off            0          0  n/a      n/a         3  n/a
 1/14 On    On          3004       4000  802.3af  Class 1     3  n/a
 1/15 On    Off            0          0  n/a      n/a         3  n/a
 1/16 On    On          3098       7000  802.3af  Class 2     3  n/a
 1/17 On    On          1784       7000  802.3af  Class 2     3  n/a
 1/18 On    On          2817       7000  802.3af  Class 2     3  n/a
 1/19 On    On          4131      15400  802.3af  n/a         3  n/a
 1/20 Off   Off            0          0  n/a      n/a         3  n/a
 1/21 Off   Off            0          0  n/a      n/a         3  n/a
 1/22 Off   Off            0          0  n/a      n/a         3  n/a
1/23- Off   Off            0          0  n/a      n/a         3  n/a
1/23- Off   Off            0          0  n/a      n/a         3  n/a
-------------------------------------------------------------------------------
 Total                             66850     164800

 Grand Total                       66850     164800
```


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4. Interoperability Compliance Testing

The interoperability compliance testing focused on verifying PoE interoperability between the Foundry Networks FastIron Super X switch and Avaya IP Telephones and Avaya AP-8 Wireless Access Point.

4.1. General Test Approach

The general test approach was to connect the Avaya PDs (Avaya IP Telephones and Avaya AP-8 Wireless Access Point) to PoE-enabled ports on the Foundry Networks FastIron Super X switch and verify that the PDs successfully boot. To verify that power and data can be simultaneously carried on the PoE connections, phone calls were made from the IP Telephones to and from Avaya IP Softphone operating from a wireless laptop accessing the network via the AP-8.

4.2. Test Results

All Power over Ethernet test cases completed successfully. The Foundry Networks FastIron Super X switch successfully provided inline power to the Avaya PDs. **Table 2** below lists the 802.3af class, allocated power, and measured power of the Avaya PDs when connected to the Foundry Networks FastIron Super X switch. The measured power listed is for the particular phone being tested.

Avaya Powered Device	**802.3af Class**	**Allocated Power (W)**	**Measured Power (mW)**		**Observations**
			Idle	**Spkr** max vol	
4601	2	7	1784	-	See Note 1
4602	1	4	2723	2817	
4602SW	2	7	3098	4000	
4610SW	2	7	3004	3756	
4620	3	15.4	6854	7314	
4620SW (Post 11/2004)	2	7	4882	6667	
4621SW	2	7	5070	-	
4622SW	2	7	4882	5915	
4625SW	3	15.4	7230	8400	
5601	2	7	2817	-	See Note 1
5602SW	1	4	3004	-	
5610SW	2	7	3098	-	
Gen-2 4606	n/a	15.4	4695	5153	See Note 2
Gen-2 4612	n/a	15.4	4789	5216	See Note 2
Gen-2 4624	n/a	15.4	4601	5101	See Note 2
AP-8	n/a	15.4	4131	-	

Table 2: 802.3af Class, Allocated Power, and Measured Power for Avaya IP Telephones and Wireless Access Point connected to Foundry Networks FastIron Super X Switch

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Table 3 below summarizes the 802.3af classes.

Class	PSE Output Max. Power (W)
0	15.4
1	4.0
2	7.0
3	15.4
4	Treat as Class 0

Table 3: IEEE 802.3af PSE and Powered-Device Power Classifications

Note 1: The 4601 and 5601 IP Telephones do not have a speakerphone button.

Note 2: The Foundry Networks FastIron Super X switch indicates Class 0 as n/a in the CLI.

5. Verification Steps

The following steps were used to verify the configuration:

1. Ensure that PoE has been enabled on the Foundry Networks FastIron Super X switch and the ports that serve the PDs.
2. Connect the Avaya PD to a PoE enabled port on the Foundry Network FastIron Super X switch and verify that the PD powers on successfully. If the PD does not power on, enter the command **sh inline power** to confirm PoE is enabled on the port.
3. Verify that the Avaya 4600 Series IP Telephones successfully register with Avaya Communication Manager and complete phone calls to other phones (assumes the IP telephones have been configured with the correct IP and call control information).
4. Verify that the Avaya 5600 Series IP Telephones successfully register with Avaya IP Office and complete phone calls to other phones (assumes the IP telephones have been configured with the correct IP and call control information).
5. Verify the Avaya Wireless Access Point by having an Avaya IP Softphone running on a wireless laptop accessing the network via the Access Point successfully register with Avaya Communication Manager and complete phone calls to other phones (assumes the IP Softphone has been configured with the correct IP and call control information).
6. Verify the Avaya IP Telephone continues to function properly when the speakerphone volume is turned up to max value.

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6. Support

For technical support on Foundry Networks products, contact the Technical Support Center using any of the following options:

- Toll-free: 1-877-TURBOCALL (1-877-887-2622)
- Direct: 408-586-1881
- Email: support@foundrynet.com

7. Conclusion

These Application Notes describe the steps for configuring the Foundry Networks FastIron Super X Switch to provide inline Power over Ethernet (PoE) to the Avaya PDs, namely Avaya IP Telephones and Avaya Wireless Access Points. During compliance testing, the Avaya PDs simultaneously obtained power and transferred data over standard Ethernet cables from the Foundry Networks FastIron Super X Switch.

8. Additional References

- Product documentation for Avaya products may be found at http://support.avaya.com.
- Product documentation for Foundry Networks products may be found at: http://www.foundrynet.com

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